

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-32. (Canceled)

33. (Currently amended) An electro-static chucking mechanism for chucking an object electro-statically comprising:

a stage including a dielectric block having a chucking surface with a concave to be closed by the object for chucking thereon;

gas introducing channels communicating with the concave ~~portion~~;

a chucking electrode provided in the dielectric block;

a main body fixed to the dielectric block and having a cavity;

a temperature controller attached to the main body to circulate a coolant to the cavity for controlling temperature of the object;

a chucking power supply connected to the chucking electrode to apply voltage thereto to chuck the object;

a gas introduction system connected to the gas introducing channels for introducing helium gas as heat-exchange gas into the concave to control temperature of the object while increasing pressure in the concave;

wherein the concave ~~portion~~ includes a heat-exchange ~~concaves~~ concave for promoting heat-exchange under increased pressure having a depth in a range of 1 to less than 20 μ m, and a gas-diffusion ~~concaves~~ concave deeper than the heat-exchange ~~concaves~~ concave for diffusing the heat-exchange gas to the heat-exchange ~~concaves~~; concave

~~said gas-diffusion concaves include circumferential concaves coaxially to the stage, and radial concaves extending from a center of the stage, said circumferential concaves having an outermost concave located inside a marginal convex, and a plurality of inner concaves inside the outermost concaves, said radial concaves crossing the inner concaves and reaching the outermost concave; and~~

~~all of the gas introducing channels communicate with the gas diffusion concaves at positions off the center of the stage; and~~

~~lift pins for receiving and transferring the object, each lift pin being disposed in each gas introducing channel so that the heat exchange gas is introduced to the concave only through the gas introducing channels in which the lift pins are provided.~~

34-40. (Canceled)

41. (Previously presented) An electro-static chucking mechanism as claimed in claim 33, wherein said chucking surface has a contact area to contact with the object in the range of 3 to 20% relative to a surface area of the object facing the stage.

42. (Previously presented) An electro-static chucking mechanism as claimed in claim 41, wherein said gas-diffusion concave has an area on the chucking surface in a range of 5 to 30% relative to a surface area of the object facing the stage.

43. (Previously presented) An electro-static chucking mechanism as claimed in claim 42, wherein said gas-diffusion concave has a depth in the range of 50 to 1,000 μm .

44-47. (Canceled)

48. (Previously presented) A surface processing apparatus, comprising:
a process chamber for receiving an object to be processed therein; and
the electro-static chucking mechanism according to claim 33, said electro-static chucking mechanism facing an inner surface of the process chamber for chucking said object electro-statically thereon in the process chamber.

49-55. (Canceled)

56. (Previously presented) A surface processing apparatus as claimed in claim 48, wherein said chucking surface has a contact area to contact with the object in the range of 3 to 20% relative to a surface area of the object facing the stage.

57. (Previously presented) A surface processing apparatus as claimed in claim 56, wherein said gas-diffusion concave has a cross-sectional area along the chucking

surface in a range of 5 to 30% relative to a surface area of the object facing the stage.

58. (Previously presented) A surface processing apparatus as claimed in claim 57, wherein said gas-diffusion concave has a depth in the range of 50 to 1,000 μm .

59. (New) An electro-static chucking mechanism as claimed in claim 33, wherein said gas-diffusion concave has an area on the chucking surface in a range of 5 to 30 % relative to a surface area of the object facing the stage.

60. (New) An electro-static chucking mechanism as claimed in claim 33, wherein said gas-diffusion concave has a depth in the range of 50 to 1,000 μm .

61. (New) An electro-static chucking mechanism as claimed in claim 33, wherein

said gas introduction channels communicate with said gas-diffusion concave at outlets thereof,

all of the outlets are located off the center of the stage and located on a circumference in coaxial to the center of the state at every equal angle, and

each outlet is wider than a width of the gas-diffusion concave.

62. (New) An electro-static chucking mechanism as claimed in claim 61, further comprising lift pins for receiving and passing said object, each lift pin being disposed in each gas introducing channel so that the heat-exchange gas is introduced to the concave only through the gas introducing channel in which the lift pins are disposed.

63. (New) A surface processing apparatus as claimed in claim 48, wherein said gas-diffusion concave has an area on the chucking surface in a range of 5 to 30 % relative to a surface area of the object facing the stage.

64. (New) A surface processing apparatus as claimed in claim 57, wherein said gas-diffusion concave has a depth in the range of 50 to 1,000 μm .

65. (New) A surface processing apparatus as claimed in claim 48, wherein
said gas introduction channels communicate with said gas-diffusion concave at outlets thereof,

all of the outlets are located off the center of the stage and located on a circumference in coaxial to the center of the stage at every equal angle, and each outlet is wider than a width of the gas-diffusion concave.

66. (New) A surface processing apparatus as claimed in claim 65, further comprising lift pins for receiving and passing said object, each lift pin being disposed in each gas introducing channel so that the heat-exchange gas is introduced to the concave only through the gas introducing channel in which the lift pins are disposed.